Proposed Item for Biobased Designation

The following biobased product information has been collected to support item designation by USDA for the BioPreferred Program. This summary reflects data available as of September 15, 2008.

Title: Heat Transfer Fluids

Description: Products with high thermal capacities used to facilitate the transfer of heat from one location to another, including coolants or refrigerants for use in HVAC applications, internal combustion engines, personal cooling devices, thermal energy storage, or other heating or cooling closed-loops.

Companies Supplying Item: 5 companies supplying Heat Transfer Fluids have been identified through internet searches, manufacturer's directories, trade associations, and company submissions.

Industry Associations Investigated: The following industry associations have been investigated for member companies supplying Heat Transfer Fluids:

- United Soybean Board Association
- National Corn Growers Association
- Antifreeze Recyclers Association of America
- The Antifreeze Coalition
- Automotive Aftermarket Industry Association
- Air Conditioning Contractors of America

Commercially Available Products Identified: Of the companies identified, 6 Heat Transfer Fluids are commercially available on the market.

Product Information Collected: Specific product information including company contact, intended use, biobased content, and performance characteristics have been collected on 4 Heat Transfer Fluids.

Industry Performance Standards: Product information submitted by biobased manufacturers and suppliers indicate that have typically been tested to the following industry standards:

- No Results

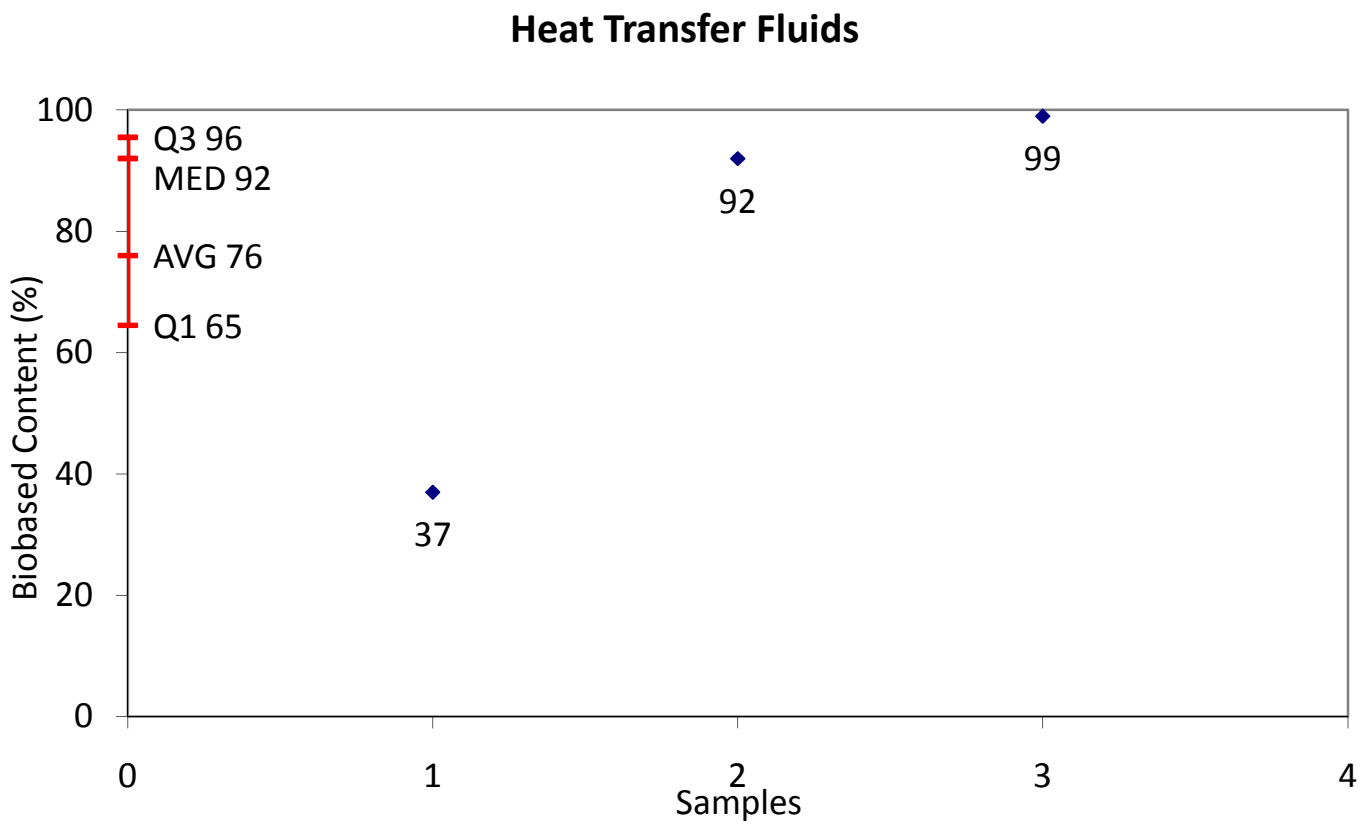
Samples Tested for Biobased Content: 3 samples of Heat Transfer Fluids have been submitted to independent laboratories for biobased content testing as specified by ASTM standard D6866-04.

Biobased Content Data: Results from biobased content testing of Heat Transfer Fluids indicate a range of content percentages from 37% minimum to 99% maximum biobased content as defined by ASTM D 6866-04. A detailed distribution of biobased content levels is included as Appendix A.

Products Submitted for BEES Analysis: Life-cycle cost and environmental effect data for 2 Heat Transfer Fluids have been submitted to NIST for BEES analysis.

BEES Analysis: The life-cycle costs of the submitted Heat Transfer Fluids range from $19.00 minimum to $21.99 maximum per usage unit. The environmental scores range from 0.0143 minimum to 0.0643 maximum. A detailed summary of the BEES results is included as Appendix B.

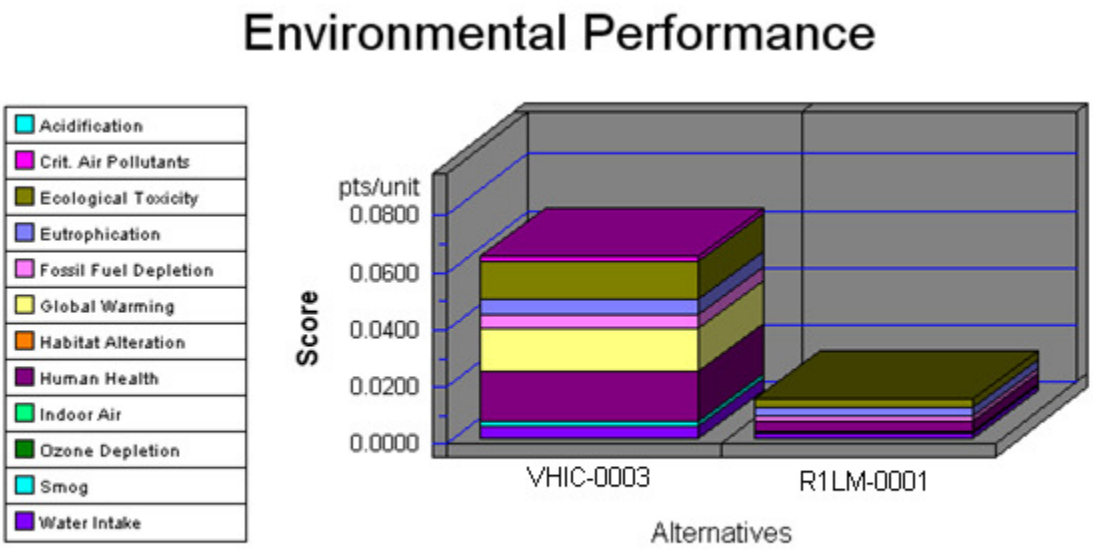
Appendix A - Biobased Content Data



	Company	Product	C14	BEES
1	VHIC	VHIC-0002	37	
2	R1LM	R1LM-0001	92	Yes
3	VHIC	VHIC-0003	99	Yes

Appendix B - BEES Analysis Results

Functional Unit: 1 gallon of product

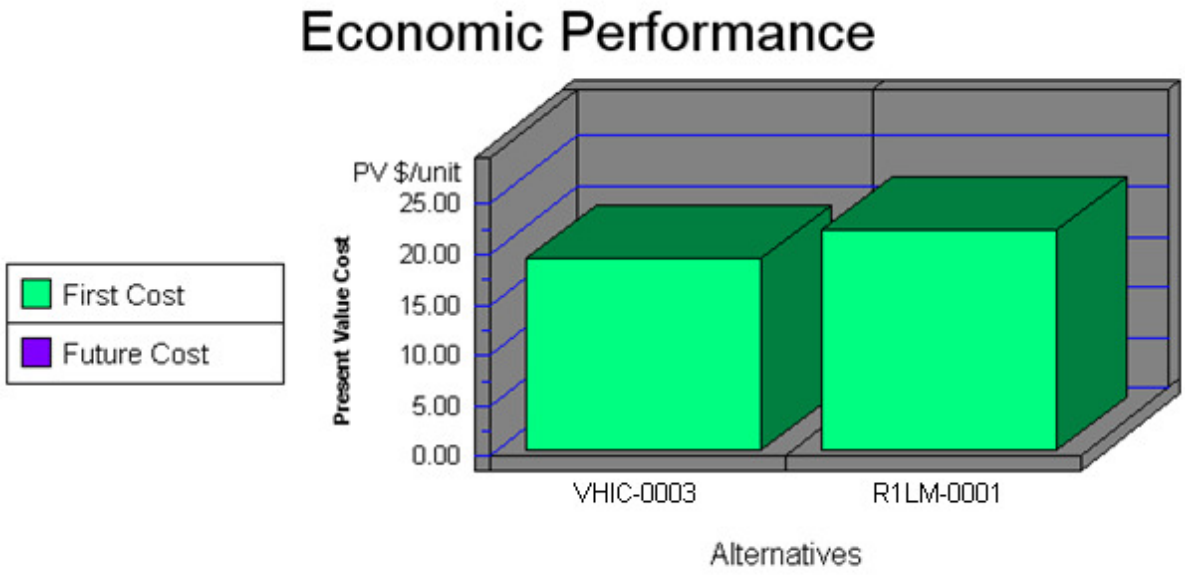


Note: Lower values are better

Category	VHIC-0003	R1LM-0001
Acidification--3%	0.0000	0.0000
Crit. Air Pollutants--9%	0.0022	0.0002
Ecolog. Toxicity--7%	0.0131	0.0031
Eutrophication--6%	0.0051	0.0029
Fossil Fuel Depl.--10%	0.0054	0.0019
Global Warming--29%	0.0148	0.0001
Habitat Alteration--6%	0.0000	0.0000
Human Health--13%	0.0175	0.0033
Indoor Air--3%	0.0000	0.0000
Ozone Depletion--2%	0.0000	0.0000
Smog--4%	0.0019	0.0006
Water Intake--8%	0.0043	0.0022
Sum	0.0643	0.0143

Heat Transfer Fluids			
Impacts	Units	VHIC-0003	R1LM-0001
Acidification	millimoles H^+ equivalents	1.27E+04	1.44E+03
Criteria Air Polutants	microDALYs	4.61E+00	3.41E-01
Ecotoxicity	g 2,4-D equivalents	1.53E+02	3.65E+01
Eutrophication	g N equivalents	1.63E+01	9.19E+00
Fossil Fuel Depletion	MJ surplus energy	1.91E+01	6.69E+00
Global Warming	g CO_2 equivalents	1.30E+04	5.59E+01
Habitat Alteration	T&E count	0.00E+00	0.00E+00
Human Health--Cancer	g C_6H_6 equivalents	1.10E+01	2.09E+00
Human Health--NonCancer	g C_7H_8 equivalents	2.28E+04	2.08E+03
Indoor Air Quality	g TVOCs	0.00E+00	0.00E+00
Ozone Depletion	g CFC-11 equivalents	1.46E-05	2.62E-06
Smog	g NO_x equivalents	7.21E+01	2.11E+01
Water Intake	liters of water	2.82E+02	1.49E+02
Functional Unit	----------	1 gallon of product	

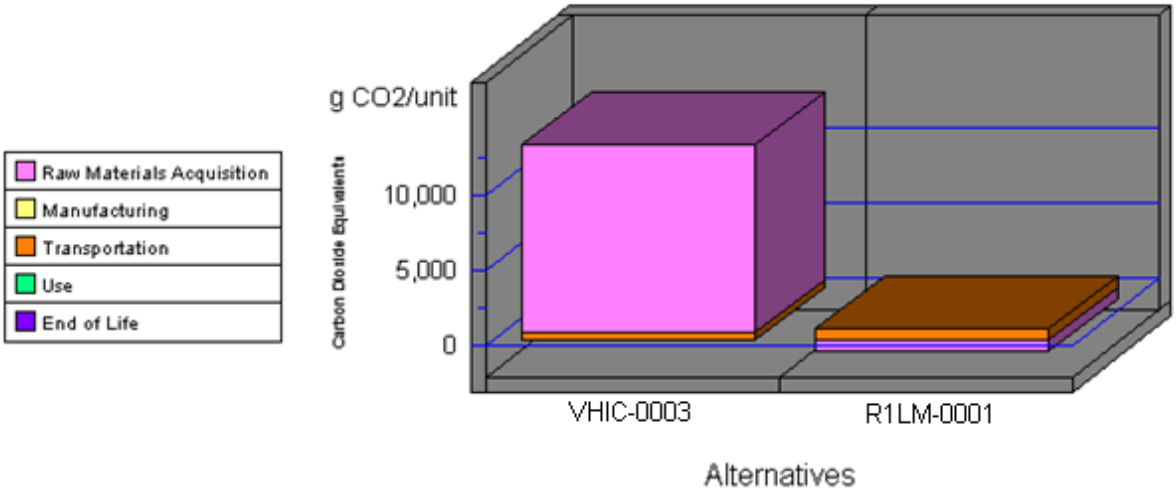
1 Following are more complete descriptions of units: Acidification: millimoles of hydrogen ion equivalents; Criteria Air Pollutants: micro Disability-Adjusted Life Years; Ecological Toxicity: grams of 2,4-dichlorophenoxy-acetic acid equivalents; Eutrophication: grams of nitrogen equivalents; Fossil Fuel Depletion: megajoules of surplus energy; Global Warming: grams of carbon dioxide equivalents; Habitat Alteration: threatened and endangered species count; Human Health-Cancer: grams of benzene equivalents; Human Health-NonCancer: grams of toluene equivalents; Indoor Air Quality: grams of Total Volatile Organic Compounds; Ozone Depletion: grams of chloroflourocarbon-11 equivalents; Smog: grams of nitrogen oxide equivalents; and Water Intake: liters of water.



Category	VHIC-0003	R1LM-0001
First Cost	19.00	21.99
Future Cost-- 3.0%	0.00	0.00
Sum	19.00	21.99

*This is a consumable product. Therefore, future costs are not calculated.

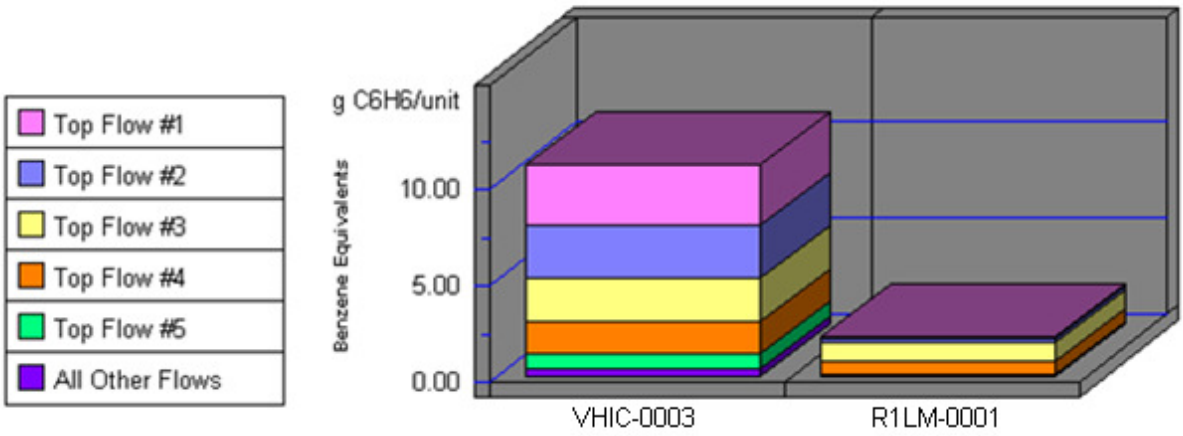
Global Warming by Life-Cycle Stage



Note: Lower values are better

Category	VHIC-0003	R1LM-0001
1. Raw Materials	12436	-751
2. Manufacturing	12	2
3. Transportation	588	805
4. Use	0	0
5. End of Life	0	0
Sum	13036	56

Human Health Cancer by Sorted Flows*

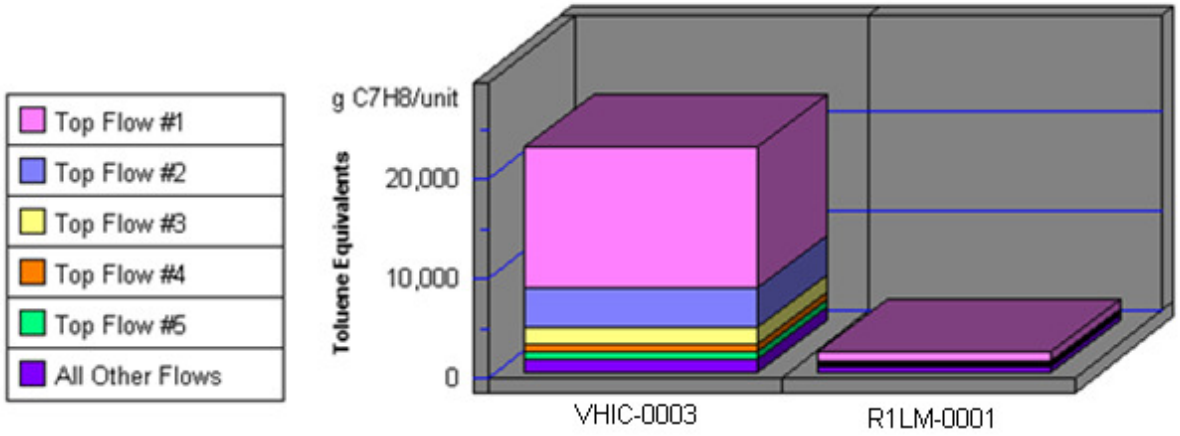


Note: Lower values are better

Category	VHIC-0003	R1LM-0001
Cancer--(a) Dioxins (unspecifie	3.11	0.12
Cancer--(a) Arsenic (As)	2.72	0.12
Cancer--(w) Arsenic (As3+, As5+	2.21	1.07
Cancer--(w) Phenol (C6H5OH)	1.71	0.67
Cancer--(a) Atrazine (C8H14ClN5	0.78	0.00
All Others	0.43	0.12
Sum	10.97	2.09

*Sorted by five topmost flows for worst-scoring product

Human Health Noncancer by Sorted Flows*



Note: Lower values are better

Category	VHIC-0003	R1LM-0001
Noncancer--(a) Mercury (Hg)	14,146.17	793.68
Noncancer--(a) Dioxins (unspeci	3,920.00	153.60
Noncancer--(a) Lead (Pb)	1,840.19	185.73
Noncancer--(a) Cadmium (Cd)	773.99	68.83
Noncancer--(w) Barium (Ba++)	590.61	294.48
All Others	1,482.50	586.80
Sum	22,753.47	2,083.11

*Sorted by five topmost flows for worst-scoring product